

CLAIMS

What is claimed is:

- 1 1. An apparatus comprising:
 - 2 a mask protective device including a transparent portion that is transparent to a
 - 3 photolithography radiation;
 - 4 a patterned mask including a pattern defined at least in part by an opaque
 - 5 portion that is opaque to the particular photolithography radiation;
 - 6 a wall to connect the mask protective device with the patterned mask, the mask
 - 7 protective device, the patterned mask, and the wall defining a gas-filled enclosure; and
 - 8 a vent to add a first gas to the enclosure and to remove a second gas from the
 - 9 enclosure, the first gas having a substantially different composition than the second
 - 10 gas.
- 1 2. The apparatus of claim 1, wherein the mask protective device is
2 attached to the patterned mask with an adhesive.
- 1 3. The apparatus of claim 1, further comprising a gas source having a
2 higher concentration of the first gas than the enclosure and a lower concentration of
3 the second gas than the enclosure and connected with the vent to add the first quantity
4 of the first gas to the enclosure through the vent.
- 1 4. The apparatus of claim 1, wherein the vent includes a first enclosure
2 opening defined by the wall and a second enclosure opening defined by the wall.
- 1 5. The apparatus of claim 4, wherein the wall has a first side and a second
2 side opposite the first side, and wherein the first enclosure opening is in the first side
3 and the second enclosure opening is in the second side.

1 6. The apparatus of claim 1, further comprising a radiation source to
2 generate radiation with a different wavelength than the photolithography radiation to
3 transmit radiation through the enclosure to increase the rate of diffusion of the gas in
4 the enclosure.

1 7. The apparatus of claim 1, further comprising a rotary vacuum
2 generator, the rotary vacuum generator including a rotor and a compression chamber
3 to reduce the total pressure inside the enclosure to below 500 millimeters of mercury.

1 8. The apparatus of claim 1, wherein the first gas that has a higher
2 transmissivity for the photolithography radiation than the second gas.

1 9. The apparatus of claim 1, wherein the vent has a surface area on the
2 wall that is at least five percent of a total surface area of the wall.

1 10. The apparatus of claim 1, wherein the vent comprises:
2 an inlet opening defined by the wall to add a first gas to the enclosure; and
3 an outlet opening defined by the wall to remove a second gas from the
4 enclosure.

1 11. The apparatus of claim 10, further comprising:
2 a gas source having the first gas at a pressure that is higher than the
3 pressure of the enclosure and connected with the inlet opening to add the first gas to
4 the enclosure through the inlet opening; and
5 a gas destination having a volume at a pressure that is lower than the pressure
6 of the first gas at the gas source and connected with the outlet opening to remove the
7 second gas from the enclosure through the outlet opening.

1 12. The apparatus of claim 10, wherein the wall has a first side and a
2 second side opposite the first side, and wherein the inlet opening is in the first side of
3 the wall and the outlet opening is in the second side of the wall.

1 13. The apparatus of claim 10, wherein the inlet opening includes a
2 plurality of discrete ports.

1 14. The apparatus of claim 10, wherein the first gas absorbs less of the
2 photolithography radiation than the second gas.

1 15. An apparatus comprising:
2 a mask protective device including a transparent portion that is transparent to a
3 particular photolithography radiation;
4 a patterned mask including a pattern defined at least in part by an opaque
5 portion that is opaque to the particular photolithography radiation;
6 a wall to connect the mask protective device with the patterned mask, wherein
7 the mask protective device, the patterned mask, and the wall define an enclosure; and
8 a gas filling the enclosure, the gas having a transmissivity of the
9 photolithography radiation greater than that of the surrounding ambient air.

1 16. The apparatus of claim 15, wherein the mask protective device is
2 attached to the patterned mask with an adhesive.

1 17. The apparatus of claim 15, wherein the gas filling the enclosure
2 includes less than 10% molecular oxygen by volume.

1 18. A ~~method~~ comprising:

2 adding a first gas to an enclosure filled with a second gas through a
3 vent, the first gas having a different composition than the second gas, and the
4 enclosure being between a mask protective device having a portion that is transparent
5 to a photolithography radiation, a patterned mask having a portion that is opaque to the
6 photolithography radiation, and a wall connecting the mask protective device with the
7 patterned mask; and

8 removing the second gas from the enclosure through the vent.

1 19. The method of claim 18, wherein adding the first gas comprises adding
2 the first gas through an inlet opening of the vent, and wherein removing the second
3 gas comprises removing the second gas through an outlet opening of the vent.

1 20. The method of claim 19, wherein adding comprises driving the first gas
2 into the enclosure through the inlet opening by pressure, and wherein removing
3 comprises simultaneously driving the second gas from the enclosure through the outlet
4 opening by pressure.

1 21. The method of claim 18, wherein adding a first gas comprises adding a
2 molar quantity of gas substantially similar to the molar quantity of the second gas in
3 the enclosure before adding begins.

1 22. The method of claim 18, wherein adding comprises adding a first gas
2 that has a higher transmissivity for the photolithography radiation than the second gas.

1 23. The method of claim 18, wherein:
2 adding the first gas comprises providing a higher concentration of the first gas
3 on an outside of the enclosure than on an inside of the enclosure proximate the vent
4 and adding the first gas to the enclosure by diffusion; and

5 removing the second gas comprises providing a lower concentration of the
6 second gas on an outside of the enclosure than on an inside of the enclosure proximate
7 the vent and removing the second gas from the enclosure by diffusion.

1 24. The method of claim 23, wherein adding the first gas comprises adding
2 the first gas through at least two openings of the vent, and wherein removing includes
3 removing the second quantity of the second gas through the at least two openings.

1 25. The method of claim 18, further comprising transmitting radiation
2 having a different wavelength than a wavelength of the photolithography radiation
3 through the enclosure to increase the diffusion coefficient of a molecule in the
4 enclosure.

1 26. The method of claim 18, further comprising reducing the total pressure
2 inside the enclosure to below 500 millimeters of mercury.

1 27. The method of claim 18, wherein adding comprises adding a first gas
2 that has a higher transmissivity for the photolithography radiation than the second gas.

1 28. A method comprising:
2 attaching a mask protective device having a portion that is transparent
3 to a photolithography radiation to a wall, the wall being attached to a patterned mask
4 having a portion that is opaque to the photolithography radiation, the attaching
5 enclosing a volume of a second gas between the mask protective device and the
6 patterned mask;

7 adding the first gas to the enclosed volume of the second gas, the first gas
8 having a different composition than the second gas; and
9 removing the second gas from the enclosed volume.

1 29. The method of claim 28, further comprising transmitting the
2 photolithography radiation through the mask protective device for a predetermined
3 period of time.

1 30. The method of claim 28, wherein attaching comprises attaching with an
2 adhesive.